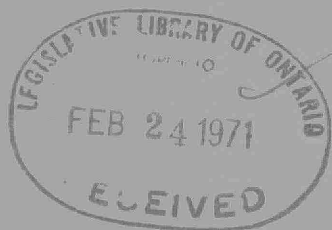


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*O.W.R.C.  
Water Pollution  
Survey*

THE  
ONTARIO WATER RESOURCES  
COMMISSION  
  
WATER POLLUTION SURVEY  
  
of the  
  
COMMUNITY OF MATTICE  
  
DISTRICT OF COCHRANE



1970

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CAZON  
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1970  
M17

REPORT

on a

WATER POLLUTION SURVEY

of the

COMMUNITY OF MATTICE

TOWNSHIP OF EILBER (UNORGANIZED)

DISTRICT OF COCHRANE

1970

District Engineers Branch

Division of Sanitary Engineering

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# R E P O R T

## THE ONTARIO WATER RESOURCES COMMISSION

### INTRODUCTION

A water pollution survey of the Community of Mattice was conducted in September 1970. The purpose of this survey was to locate and record all significant sources of water pollution within the townsite. Such surveys are performed routinely, and upon request, by the Ontario Water Resources Commission as the basis for the evaluation of all existing and potential sources of water pollution. When sources of pollution are defined, corrective action by the responsible parties is requested by the Commission.

The assistance provided during the survey by the Department of Health Regional Laboratory in Timmins is gratefully acknowledged.

### I      GENERAL INFORMATION

The Community of Mattice is located on Highway #11 on the east bank of the Missinaibi River in the Township of Eilber (unorganized), District of Cochrane. The population

of the townsite is approximately 700 people.

## II WATER SUPPLY

The citizens of Mattice obtain their domestic water from six separate, privately-owned water works systems, each of which pump water from the Missinaibi River.

Water samples are collected from these systems routinely for bacteriological examination by the Porcupine Health Unit. The quality of water from these private systems varies from season to season, but generally it has been found that the presence of coliform organisms in the drinking water has been a chronic problem over the last several years. A physical description together with past bacteriological data for each system is included in Appendix II. The number of adverse samples almost consistently exceeds the allowable limit of 10 per cent annually, set by the Ontario Water Resources Commission for drinking water supplies.

Several bacteriological samples were collected from private homes and business establishments throughout the townsite during this survey. The results of the bacteriological examination of these samples indicate that at this time no coliform organisms were present in the water systems that were sampled.

Three representative samples were collected for chemical analysis. Two of the samples were collected from private homes and the other was taken directly from the Missinaibi River. The results of the analyses revealed that an iron concentration in excess of the Commission's objectives of 0.3 ppm for drinking water, was present in samples #20-R and 30-R. This maximum limit is based on aesthetic and taste considerations. The high concentration of iron in the Missinaibi River water could be due to the leaching of soluble iron salts from the soils and rocks in the area. Iron tends to precipitate as hydroxides of iron and can stain laundry and porcelain fixtures.

It was also revealed from the chemical analyses that the concentration of phenols in sample #1-R exceeded the maximum limit of 1.0 ppb., set by the Commission for drinking water supplies. As no traces of phenols were present in the other two samples, it is suspected that the phenols are due to oil leaking from a pump in one of the water works serving the east end of the townsite. The presence of phenols in drinking water supplies may cause the water to have undesirable tastes and/or odours.

The chemical analyses results are presented in Table No.2 of this report.

Based on the discussion presented above, and the bacteriological history of the Mattice water works systems presented in Appendix II of this report, it is recommended that the Community of Mattice organize a committee to initiate a program for the construction of a single communal water works and distribution system to serve the townsite with a safe supply of potable domestic water.

### III WATER POLLUTION

#### (a) Area North of Canadian National Railway Tracks

There is no sewerage system in the section of the community located north of the Canadian National Railway tracks (see attached map). Domestic wastes from this area of the townsite are treated by private septic tank and tile bed systems. However, due to the clay overburden, the majority of these septic tanks do not operate effectively. The bacteriological results presented in Table No.3 of samples collected from the ditches throughout the townsite, indicate that domestic wastes appear to be draining from these malfunctioning septic tank systems to the local roadside ditches.

Dye testing in the washroom of a service station located on King Street, indicated that sanitary

wastes from their septic tank system are piped directly to the banks of Five Mile Creek. Waste oil from this service station is dumped over the embankment located on the east side of the establishment, into Five Mile Creek.

The flood plain in the north-east section of the townsite at the confluence of the Missinaibi River and Five Mile Creek, is drained to the river by a small ditch. A sample (6-D) taken from this ditch was found to have a high fecal coliform count indicating the presence of domestic wastes. Samples collected from water in an abandoned gravel pit at the west end of Melrose Avenue (13-P) were also found to be polluted by domestic wastes. Samples taken from several other ditches throughout the townsite also contained high fecal and total coliform counts, in excess of the Commission's objective of 2400 coliform organisms per 100 ml. of sample. Bacteriological results of the ditch and other drainage course samples are presented in Table 3 of the report.

The log cabins located at the west end of River Street on the east bank of the Missinaibi River (refer to attached map) have outdoor privies.

(b) Area South of the Canadian National Railway Tracks

Domestic wastes from most of the homes on the south section of the townsite are collected by sanitary sewers

and treated by a communal septic tank. The effluent from the tank discharges directly to Five Mile Creek as shown on the attached map. Water samples (5C and 31C) collected for bacteriological examination upstream and downstream of this discharge pipe, indicate that this septic tank effluent impairs the quality of water in the stream.

Samples taken from a number of the roadside ditches throughout the southern section of the townsite, indicate that some domestic wastes are gaining access to the local ditches.

Two public privies are located on the communal playground at the corner of Parkview Avenue and First Street. The site of these privies is being maintained in an acceptable sanitary condition.

A marshy area is located near the corner of Second and Queen Streets. A water sample (28-D) taken from a ditch which drains this area to the Missinaibi River, contained a coliform count in excess of the Commission's objective for surface water. Based on the high coliform counts and the general appearance of this marsh, it is evident that domestic wastes are gaining access to the area. This may be due to a leak in the sanitary sewer main which passes through the centre of

the block in an east-west direction. Samples #29-D and 22-D taken along the length of this ditch had notably lower coliform counts. This would be explained by dilution from surface water runoff, subsequent to a rainfall which occurred on the morning the samples were collected.

#### IV REFUSE DISPOSAL

A garbage collection service is available to the residents of Mattice. Reportedly, most of the residents are patronizing this service.

#### V LABORATORY RESULTS OF SAMPLES

The laboratory results of the bacteriological examinations and chemical analyses performed on the water samples collected during the survey, are listed in Tables 1, 2, and 3, appended to this report. The sampling stations are located by numerical code on the attached map.

Many of the samples collected from the roadside ditches throughout the townsite contained coliform counts in excess of the Commission's objective for surface waters. The high concentration of fecal coliforms in several of these samples would tend to indicate that the pollution in these ditches is caused by domestic wastes.

A description of the bacteriological examinations and the chemical analyses performed on these samples, together with the discussion of the Commission's objectives for surface water supplies, are appended to this report.

VI SUMMARY

A water pollution survey of the Community of Mattice was conducted by Ontario Water Resources Commission personnel in September, 1970.

Domestic water is supplied to homes in the community by six privately-owned water works systems, all of which obtain water from the Missinaibi River. Generally, the water from all of these systems is of doubtful bacteriological quality. In the past, samples taken from several of the distribution systems have contained high concentrations of total and fecal coliform organisms. Water containing fecal coliform organisms is considered unsafe for human consumption. Dr. G.B. Lane, Medical Officer of Health and Director of the Porcupine Health Unit, has issued a "boil water" order to the community until such time as adequate and consistent disinfection practices are in effect throughout the entire community.

The section of the community north of the Canadian National Railway tracks is not serviced with a communal sewerage system. Domestic wastes are disposed of by privately-owned septic tank and tile bed systems, which due to the clay overburden characteristic of this area, generally do not operate satisfactorily.

The section of the community south of the Canadian National Railway tracks is serviced with a sanitary sewerage system which discharges to a communal septic tank, located at the east end of the townsite.

A garbage collection service is available to the community. Reportedly, the majority of the residents are patronizing this service.

## VII      RECOMMENDATIONS

This survey has resulted in several recommendations to improve the existing conditions within the Community of Mattice. These are as follows:


1. It is recommended that the residents of the community devote serious consideration to adopting a program for the construction of an improved, central communal water works system.

2. A communal sanitary waste collector system should be constructed to serve the section of Mattice north of the Canadian National Railway tracks.
3. Sanitary wastes from the entire community should be directed to one central sewage treatment facility, capable of producing an effluent within the OWRC's objectives of 15 ppm. each for BOD and suspended solids, for waste discharges to a water-course.

Until such time as concrete action can be initiated in regard to the above recommendations, every effort should be made to protect the roadside ditches and local watercourses from contamination, by repairing the existing faulty tile bed systems.

/fp

Prepared by:

  
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Civil Technologist  
Division of Sanitary Engineering

TABLES OF LABORATORY RESULTS

T A B L E   N O . 1

DISTRIBUTION SYSTEM WATER SAMPLES

<u>Sampling Point No.</u>	<u>Location</u>	<u>Date</u>	<u>M.P.N. Coliform Count</u>	
			<u>Fecal</u>	<u>Total</u>
1-R	Imperial Service Station on King St.	Sept.29/70	0	0
3-R	Gulf Service Station on King St.	"	0	0
4-R	Home on Melrose Ave.E.	"	0	0
11-R	Home on Melrose Ave. near Second St.	"	0	0
16-R	Home on Queen St.W.	"	0	0
19-R	Home on Balmoral Ave.W.	"	0	0
27-R	Home at corner of Queen and Third Sts.	"	0	0
30-R	Home at Balmoral Ave.E.	"	0	0
32-R	Service Station at corner of King and Third Sts.	"	0	0
34-R	Home near Melrose Ave.W.	"	0	0
35-R	Home on Parkview Ave.W.	"	0	0
36-R	Home on Balmoral Ave.W.	"	0	0
37-R	Home at corner of Balmoral Ave. and Second St.	"	0	0
38-R	Home on Balmoral Ave.E.	"	0	0
39-R	Home on Parkview Ave.E.	"	0	0
40-R	Home on Parkview Ave. near Second St.	"	0	0
41-R	Home on Queen St. near Second St.	"	0	0

T A B L E 2

CHEMICAL ANALYSES OF DOMESTIC (RIVER) WATER SAMPLES

<u>Sampling Point No.</u>	<u>Location</u>	<u>Date</u>	<u>Hardness as CaCO<sub>3</sub> in ppm</u>	<u>Alkalinity as CaCO<sub>3</sub> in ppm</u>	<u>Iron as Fe in ppm</u>	<u>Chloride as Cl in ppm</u>	<u>pH at Lab</u>	<u>Phenols in ppb</u>
1-R	Domestic water from service station at east end of community	Sept.29/70	66	75	0.30	6	7.9	6
20-R	Raw water directly from Missinaibi River	Sept.29/70	86	77	0.70	2	7.9	0
30-R	Domestic water from private home	Sept.29/70	84	75	0.50	6	7.9	0

T A B L E N O. 3

ROADSIDE DITCHES AND LOCAL WATERCOURSES

<u>Sampling Point No.</u>	<u>Location</u>	<u>Date</u>	<u>M.P.N. Coliform Count</u>	
			<u>Fecal</u>	<u>Total</u>
2-D	South drainage ditch at east end of King St.	Sept.29/70	170	2,100
5-C	Five-Mile Creek outfall to Missinaibi River	"	8,000	40,000
6-D	Drainage ditch to Missinaibi River	"	2,100	40,000
7-R	Raw water from Missinaibi R. at foot of Third St.	"	800	2,300
8-D	Drainage ditch water behind Community Recreation Centre	"	13,000	70,000
9-D	Drainage ditch crossing Melrose Ave. near Third St.	"	6,000	33,000
10-D	Drainage culvert outfall at Third St. and Melrose Ave.	"	160	1,400
12-D	Roadside ditch on Melrose Ave.W.	"	800,000	4,000,000
13-P	Abandoned gravel pit con- taining domestic wastes	"	800,000	8,000,000
14-D	Drainage ditch at corner of Melrose Ave. and Second St.	"	800,000	8,000,000
15-D	Roadside ditch on south side of King St.W.	"	150	110,000
17-D	Roadside ditch on River St.	"	800	1,600

TABLE NO. 3 (continued)

-2-

18-D	Roadside ditch on Balmoral Ave.W.	Sept.29/70	1,800	2,000
20-R	Raw water from Missinaibi R. adjacent to River St.	"	120	175
21-D	Roadside ditch on Parkview Ave.W.	"	19,000	50,000
22-D	Drainage ditch at corner of Parkview Ave. and Second St.	"	200	1,500
23-D	Drainage ditch on south side of C.N. Railway opposite Second St.	"	200	500
24-D	Roadside ditch on north side of Queen St. opposite Second St.	"	3,000	6,100
25-D	Drainage ditch crossing Queen St. west of Third St.	"	13,000	16,000
26-D	Drainage ditch on south side of C.N. Railway at foot of Third St.	"	40	120
28-D	Drainage ditch crossing Balmoral Ave.E.	"	4,400	23,000
29-D	Drainage ditch crossing Parkview Ave.E.	"	600	1,100
31-C	Five-Mile Creek upstream of communal septic tank outfall	"	600	3,100

APPENDIX I

SIGNIFICANCE OF LABORATORY RESULTS

## APPENDIX I

### SIGNIFICANCE OF LABORATORY RESULTS

#### BACTERIOLOGICAL EXAMINATION

The presence of faecal coliforms (FC) is indicative of pollution from human or animal excrement. The total coliform count represents the total number of coliform organisms present of both faecal and non-faecal origin.

The OWRC laboratories employ the Membrane Filter (MF) technique of examination to obtain a direct enumeration of coliform organisms. The Department of Health Laboratories use the Most Probable Number (MPN) enumeration and coliform counts are reported as Total Coliform Organisms (TC) and Faecal Coliform Organisms (FC).

#### Sanitary Chemical Analyses

##### Biochemical Oxygen Demand (BOD)

Biochemical Oxygen Demand is reported in parts per million (ppm) and is an indicator of the amount of oxygen required for the stabilization of decomposable organic or chemical matter.

##### Solids

The value for solids, expressed in parts per million, is the sum of the values for the suspended and the dissolved solids in the water. The concentration of suspended solids is generally the most significant to

surface water quality. The effects of suspended solids in water are reflected in difficulties associated with water purification, decomposition in streams and injury to the habitat of fish.

### Nitrogen

Ammonia Nitrogen or sometimes called free ammonia, is the insoluble product in the decomposition of nitrogenous organic matter. It is also formed when nitrates and nitrites are reduced to ammonia either biologically or chemically.

The following values may be of general significance in appraising free ammonia content:

Low - 0.015 to 0.03 ppm

Moderate - 0.03 to 0.10 ppm

High - greater than 0.10 ppm

Total Kjeldahl is a measure of the total nitrogenous matter present except that measured as nitrite and nitrate nitrogens. The Total Kjeldahl less the Ammonia Nitrogen measures the organic nitrogen present. Ammonia and organic nitrogen determinations are important in determining the availability of nitrogen for biological utilization. A normal upper limit for Total Kjeldahl would be 0.5 ppm. Polluted water would have values in excess of this limit.

### Nitrite Nitrogen

Nitrite is an intermediate step in the oxidation of ammonia. The presence of nitrite in concentrations greater than a few thousandths of a part per million is generally indicative of active biological processes in the water.

### Nitrate Nitrogen

Nitrate is the end product of aerobic decomposition of nitrogenous matter. Nitrate concentrations are of particular interest in relation to the other forms of nitrogen that may be present in the sample.

The following ranges in concentration may be used as a guide:

Low - less than 0.1 ppm

Moderate - 0.1 to 1.0 ppm

High - greater than 1.0 ppm

### Phenols

The presence of phenols or phenolic equivalents is generally associated with pollutants containing petroleum products or with some classes of industrial wastes.

Adequate protection of surface waters will be assured if the concentrations of phenols or phenolic equivalents in wastes do not exceed 20 parts per billion (ppb).

Iron

The iron concentration in potable water should not exceed 0.3 parts per million to avoid objectionable tastes, staining and sediment formation.

## APPENDIX II

- Existing water works in the Community of Mattice
- Bacteriological history of Mattice Water Works

## APPENDIX II

### PHYSICAL DESCRIPTION OF EXISTING

#### WATER WORKS IN MATTICE

##### I MATTICE UNION WATER

This system provides water for 22 private residents, a restaurant, a bank, two hotels and a school. Raw water is taken from the Missinaibi River and chlorinated continuously on a year-round basis.

##### Equipment

- 1 1/2 H.P. electric pump - capacity 900 gph (estimated)
- Everchlor automatic chlorinator
- 275 gal. pressure tank
- 1 1/2 H.P. electric driven standby pump
- pressure 70 psi (average)

##### II MATTICE (FAUCHON) WATER WORKS

This system supplies domestic water to 20 homes. Raw water is drawn from the Missinaibi River and chlorinated on a year-round basis.

##### Equipment

- 1 1/2 H.P. electric motor-- drives a double piston pump with a capacity of approximately 900 IGPH
- Everchlor automatic chlorinator
- two pressure tanks with combined capacity of 200 gallons
- no standby pump
- average line pressure - 75 psi

### III RATTE WATER WORKS

This system provides water for approximately 50 homes. Raw water is drawn from the Missinaibi River and chlorinated on a part-time basis.

#### Equipment

- 3/4 H.P. electric driven centrifugal pump - capacity approximately 900 IGPH
- Everchlor automatic chlorinator
- 275 gallon pressure tank
- 2 H.P. electric driven standby pump with capacity of 900 IGPH
- line pressure - 70 psi (average)

### IV BRETON WATER WORKS

This system provides water for 175 homes on the south side of the C.N. tracks. Raw water is drawn from the Missinaibi River and chlorinated during the warm season from May to November.

#### Equipment

- 1 H.P. electric driven double piston pump - capacity 900 IGPH
- Everchlor automatic chlorinator
- 300 gallon pressure tank
- line pressure - 70 psi (average)
- 1 H.P. electric driven double piston standby pump

V BRISSON WATER WORKS

This system serves 9 homes. Raw water is drawn from the Missinaibi River and is not chlorinated.

Equipment

- single stage vertical deep well pump of unknown capacity driven by a 1/2 H.P. electric motor
- 200 gallon pressure tank
- line pressure - 60 psi (average)
- no standby, no chlorination facilities

VI CHRISTIANSON WATER WORKS

This system provides water for approximately 12 homes. Raw water is drawn from the Missinaibi River and is chlorinated during the summer months only.

Equipment

- 1 1/2 H.P. electric driven pump - capacity - unknown
- Everchlor automatic chlorinator
- pressure tank - capacity - unknown

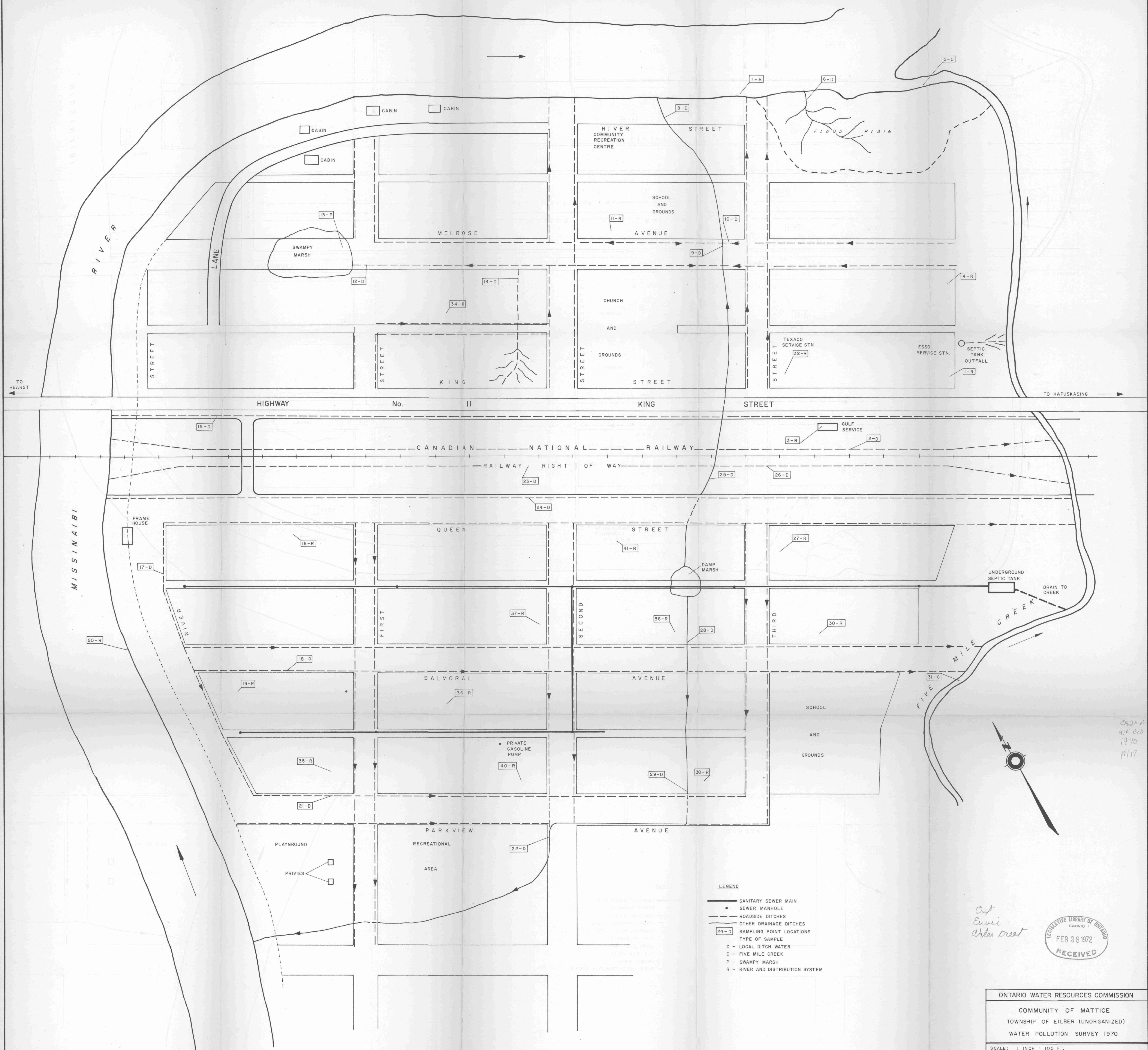
# HISTORY OF BACTERIOLOGICAL QUALITY

## OF POTABLE WATER IN MATTICE (1968, 1969, 1970)

SYSTEM	DATE	NO. COLLECTED	* NO. ADVERSE		% ADVERSE
			FC	TC	
Mattice WW	1968	14	--	3	21%
	1969	9	2	2	22%
	1970	18	0	0	0
	TOTAL	41	2	5	12%
Fauchon WW	1968	10		1	10%
	1969	10	1	3	33%
	1970	16	2	2	12%
	TOTAL	36	3	6	16%
Ratte WW	1968	11		5	46%
	1969	10	3	3	33%
	1970	18	2	4	22%
	TOTAL	39	5	12	34%
Breton WW	1968	11		6	55%
	1969	11	5	8	73%
	1970	18	3	6	33%
	TOTAL	40	8	20	54%
Brisson WW	1968	10		10	100%
	1969	10	10	10	100%
	1970	18	17	18	100%
	TOTAL	38	27	38	100%
Christianson WW	1968	10		9	90%
	1969	9	4	7	77%
	1970	15	10	14	93%
	TOTAL	34	14	30	87%

\* FC - Faecal Coliform Counts  
TC - Total Coliform Counts

Courtesy of Porcupine Health Unit and Department  
of Health Regional Laboratory, Timmins, Ontario



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